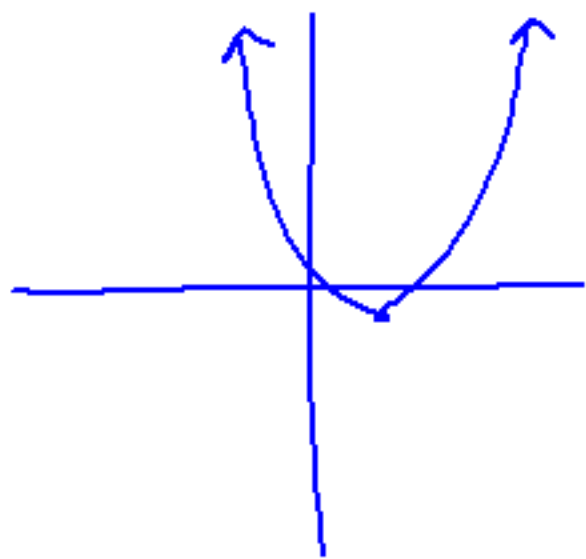
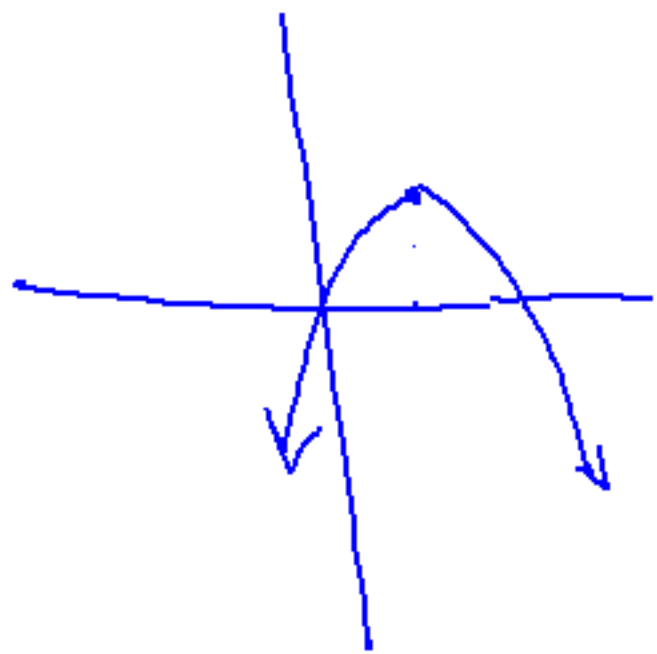


Warm Up

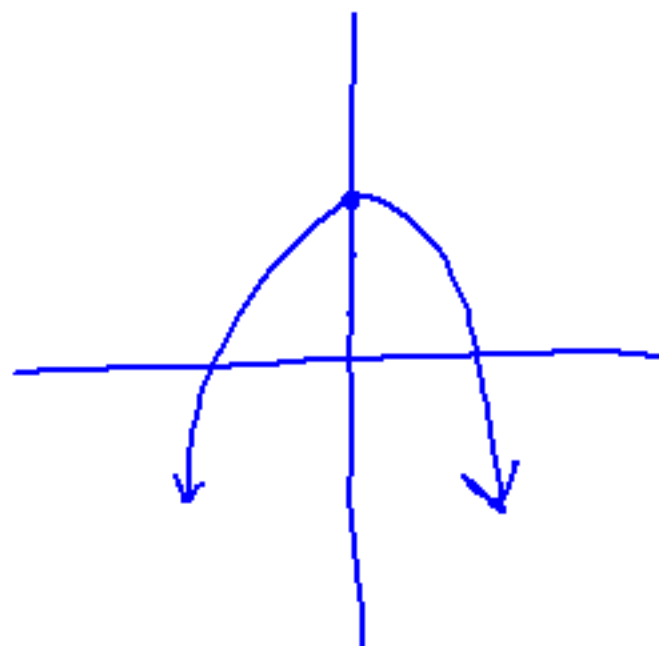
① vertex = $(1.5, -0.5)$



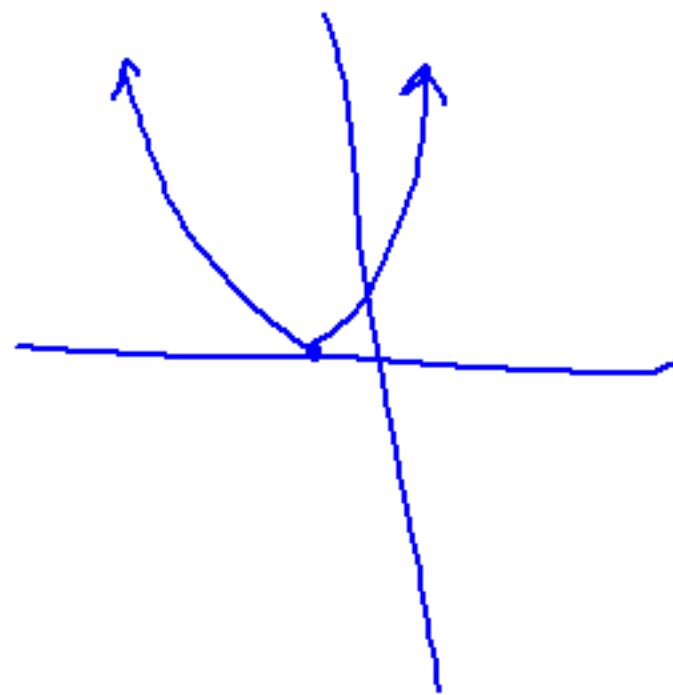
③ vertex = $(2, 2)$



② vertex = $(0, 3)$



④ vertex = $(-1, 0)$



$$\textcircled{1} \quad X = \frac{-b}{2a} = \frac{6}{4} = \frac{3}{2} = 1.5$$

$$y = 2(1.5)^2 - 6(1.5) + 4$$

$$= 2(2.25) - 9 + 4$$

$$= 4.5 - 9 + 4$$

$$= -0.5$$

$$(1.5, -0.5)$$

$$\textcircled{2} \quad y = -x^2 + 3$$

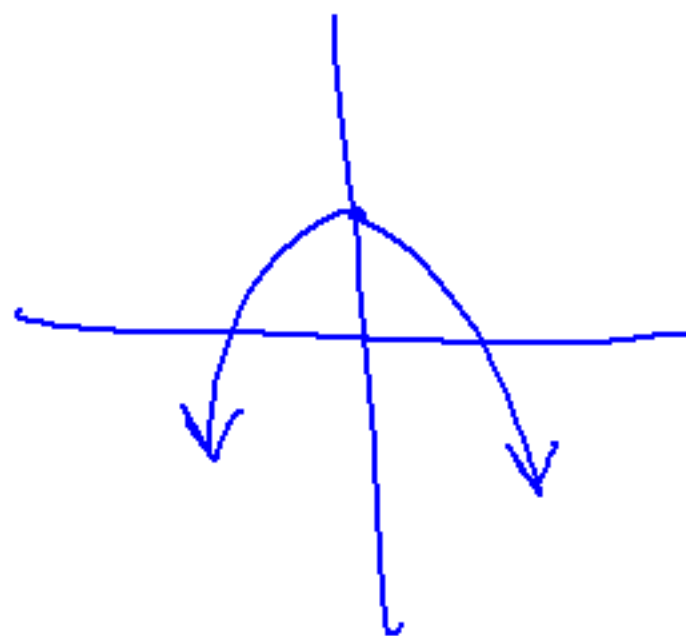
$$y = -x^2 + 0x + 3$$

$$x = \frac{0}{-2} = 0$$

$$(0, 3)$$

$$y = -(0)^2 + 3$$

$$y = 3$$



$$\textcircled{4} y = x^2 + 2x + 1$$

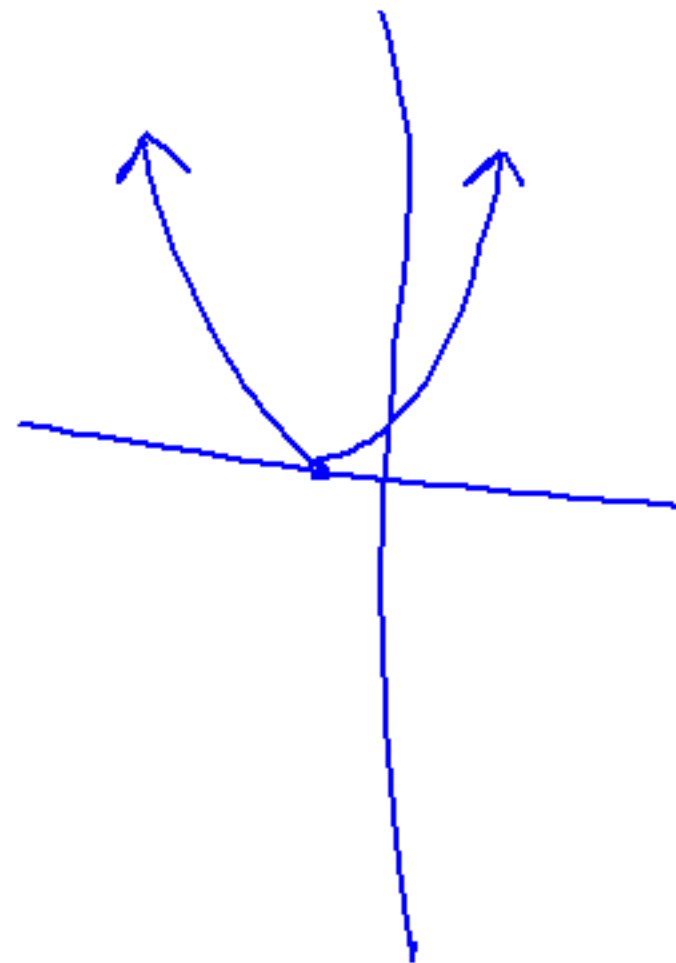
$$x = \frac{-b}{2a} = \frac{-2}{2} = -1$$

$$y = (-1)^2 + 2(-1) + 1$$

$$y = 1 - 2 + 1$$

$$y = 0$$

$$(-1, 0)$$



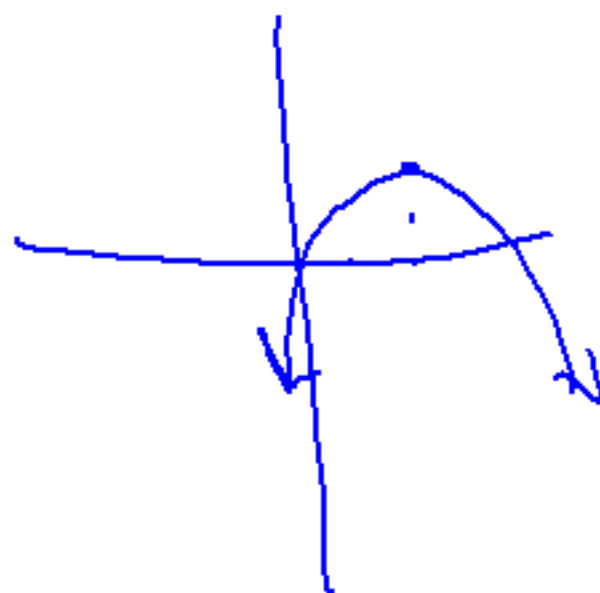
$$\textcircled{3} \quad y = -3x^2 + 12x - 10$$

$$x = \frac{-b}{2a} = \frac{-12}{-6} = 2$$

$$y = -3(2^2) + 12(2) - 10$$
$$= -12 + 24 - 10$$

$$y = 2$$

$$(2, 2)$$



standard form: $y = ax^2 + bx + c$

vertex form: $y = a(x-h)^2 + k$

opening up $a = t$

opening down $a = -$

① $y = 1 \cdot (x-2)^2 + 3$
Up

③ $y = -2(x-1)^2 + 0$
down

$x = \text{opposite of } h$

$$y = a(\cancel{x-h})^2 + \cancel{k}$$

opposite sign

④ $y = 2(\cancel{x-5})^2 + 3$

$x = 5$

⑤ $y = -4(x)^2 - 5$

$y = -4(\cancel{x+0})^2 - 5$

$x = 0$

⑥ $y = 7(\cancel{x+9})^2 + 2$

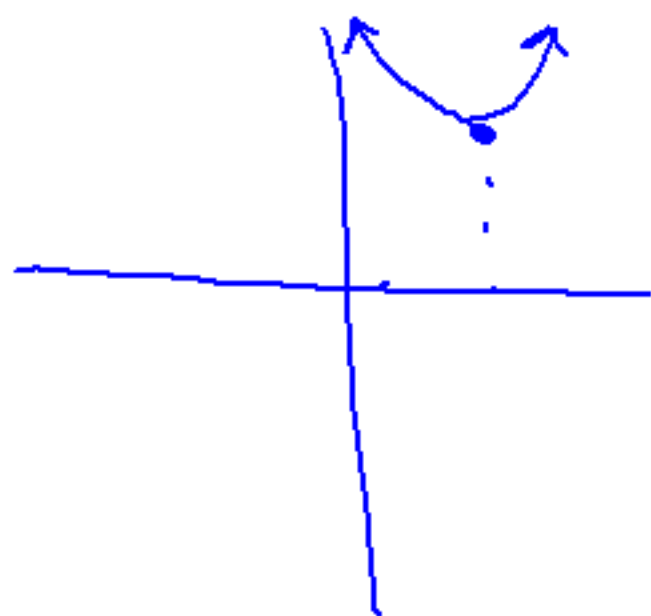
$x = -9$

$$\textcircled{7} y = (x - \textcircled{3})^2 + \textcircled{3}$$

$$x = 3$$

$$y = 3$$

$(3, 3)$

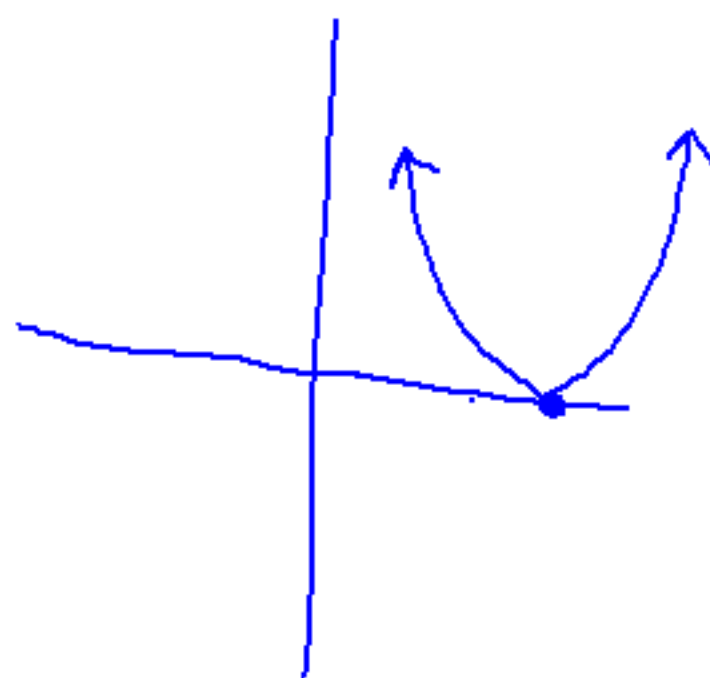


$$\textcircled{8} y = \frac{1}{2} (x - \textcircled{6})^2 + \textcircled{0}$$

$$x = 6$$

$$y = 0$$

$(6, 0)$

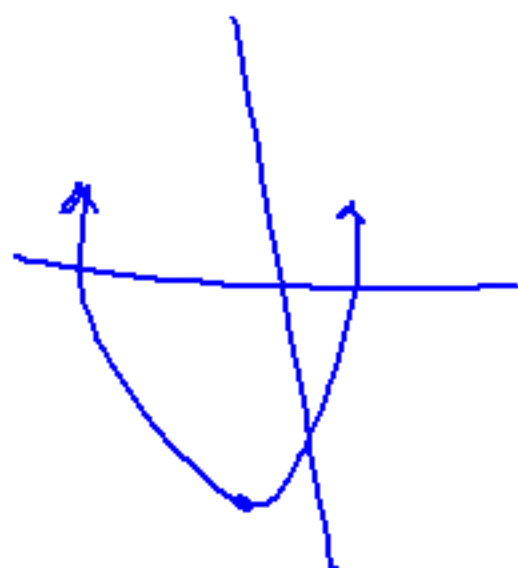


$$9) y = (x+1)^2 - 7$$

$$x = -1$$

$$y = -7$$

$$(-1, -7)$$

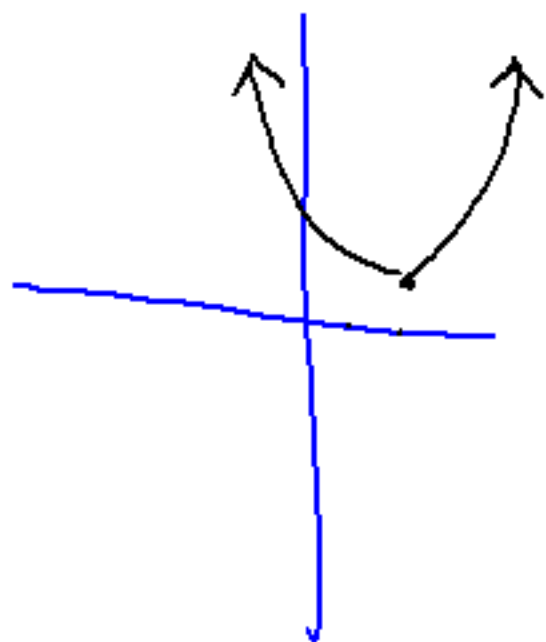


$$\textcircled{10} y = (x-2)^2 + 1$$

$$x = 2$$

$$y = 1$$

$$(2, 1)$$

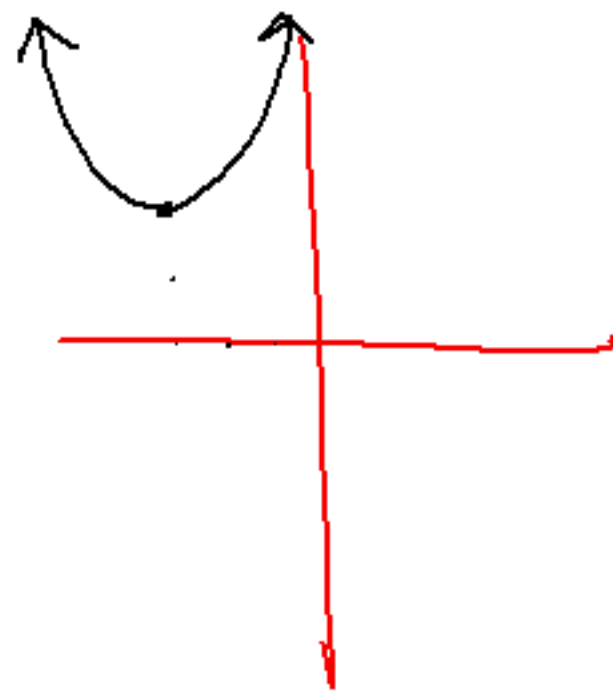


$$\textcircled{11} y = 3(x+3)^2 + 2$$

$$x = -3$$

$$y = 2$$

$$(-3, 2)$$

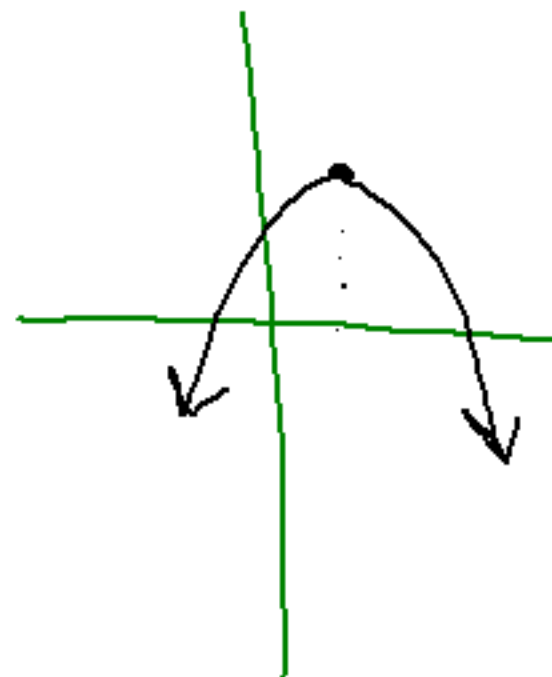


$$\textcircled{12} y = -(x-1)^2 + 3$$

$$x = 1$$

$$y = 3$$

$$(1, 3)$$

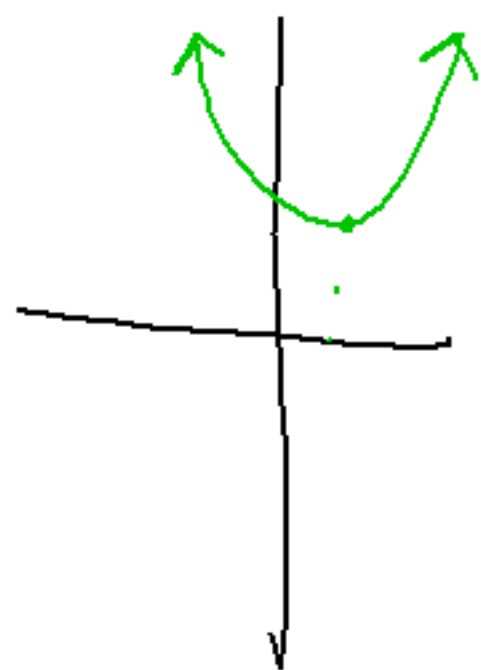


$$26) y = (x-1)^2 + 2$$

$$x = 1$$

$$y = 2$$

$$(1, 2)$$



$$27) y = -(x-2)^2 - 1$$

$$x = 2$$

$$y = -1$$

$$(2, -1)$$

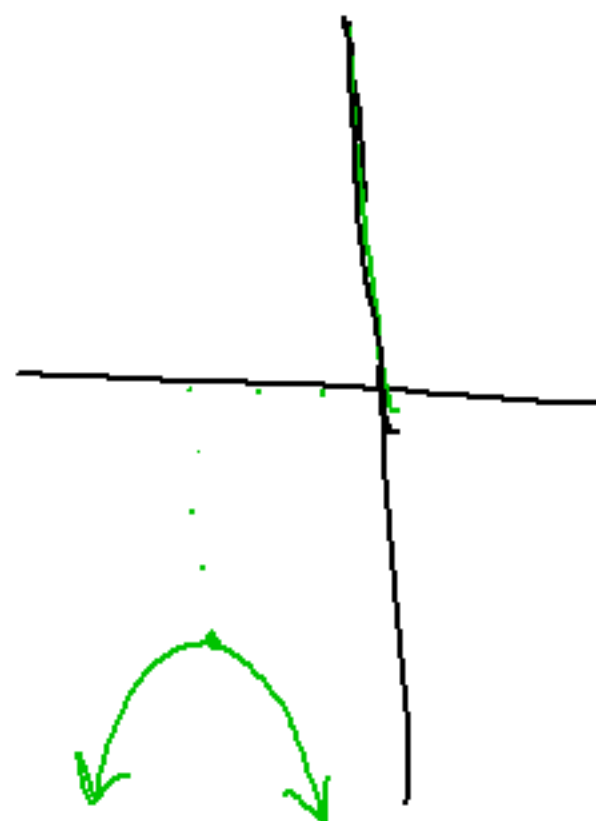


$$28) y = -2(x+3)^2 - 4$$

$$x = -3$$

$$y = -4$$

$$(-3, -4)$$



std. form $y = ax^2 + bx + c$ $x = \frac{-b}{2a}$

vertex form $y = a(x-h)^2 + k$ $(-h, k)$

Intercept form $y = a(x-p)(x-q)$

Opens up $\Rightarrow a = +$

Opens down $\Rightarrow a = -$ Up

① $y = (x-2)(x+3)$ Up
② $y = -2(x-1)(x-4)$ down
③ $y = 2x(x-3)$
 $y = 2(x+0)(x-3)$

$x = \text{halfway btw } p \text{ \& } q$
(average)

$$\textcircled{4} y = -2(x \textcircled{-1})(x \textcircled{-5})$$

$$x = \frac{-1 + -5}{2} = \frac{-6}{2} = \textcircled{-3}$$

$$\textcircled{5} y = 3(x \textcircled{+2})(x \textcircled{+4})$$

$$x = \frac{2 + 4}{2} = \textcircled{+1}$$

$$\textcircled{6} y = -x(x + 5)$$

$$y = -(x \textcircled{+0})(x \textcircled{+5})$$

$$x = \frac{0 + 5}{2} = \textcircled{2.5}$$

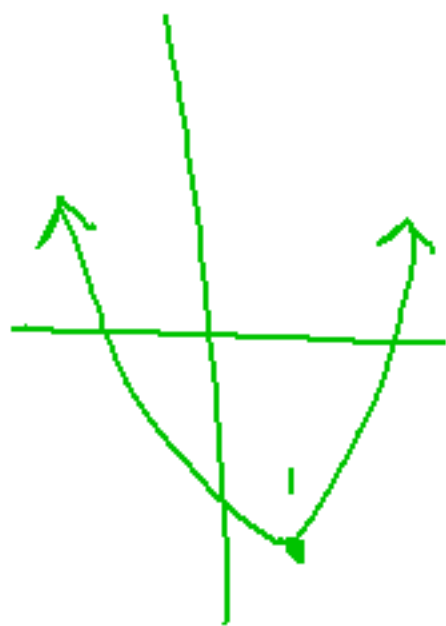
$$\textcircled{7} y = (x+5)(x-3)$$

$$x = \frac{5 + -3}{2} = \textcircled{1}$$

$$y = (1+5)(1-3)$$

$$y = 6 \cdot -2 = -12$$

$(1, -12)$



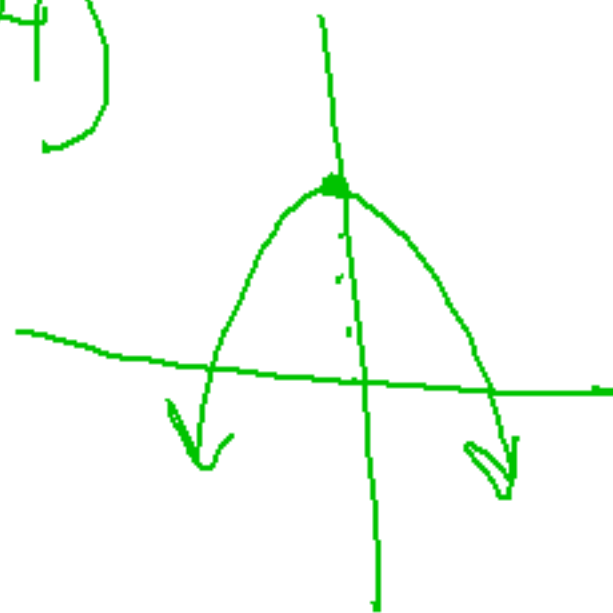
$$\textcircled{8} y = -4(x+1)(x-1)$$

$$x = \frac{1 + -1}{2} = 0$$

$$y = -4(0+1)(0-1)$$

$$y = -4(1)(-1) = \textcircled{4}$$

$(0, 4)$



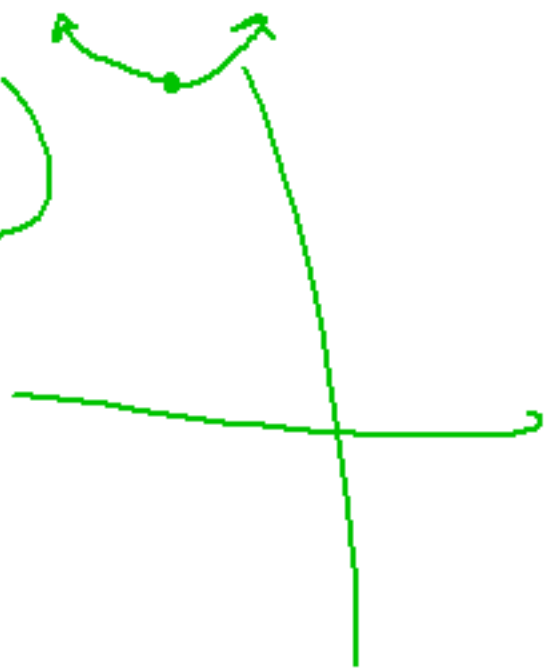
$$\textcircled{9} y = 3(x-6)(x-4)$$

$$x = \frac{-6 + -4}{2} = -5$$

$$y = 3(-5-6)(-5-4)$$

$$3(-11)(-9)$$

$$(-5, 297)$$



$$\textcircled{10} y = -2(x+2)(x-4)$$

$$x = \frac{2 + -4}{2} = -1$$

$$y = -2(-1+2)(-1-4)$$

$$-2 \cdot 1 \cdot -5$$

$$(-1, 10)$$



$$\textcircled{11} y = -x(x+2)$$

$$y = -(x+0)(x+2)$$

$$x = \frac{0+2}{2} = 1$$

$$y = -(1)(1+2)$$

$$= -1 \cdot 3 = -3$$

$$(1, -3)$$



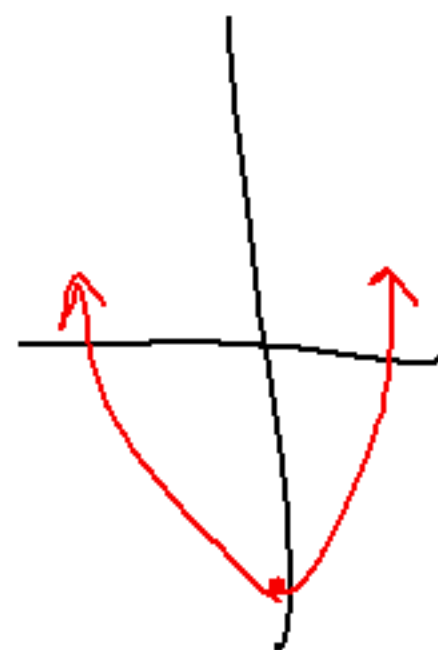
$$\textcircled{12} y = (x+3)(x-3)$$

$$x = \frac{3 + -3}{2} = 0$$

$$y = (0+3)(0-3)$$

$$3 \cdot -3 = -9$$

$$(0, -9)$$

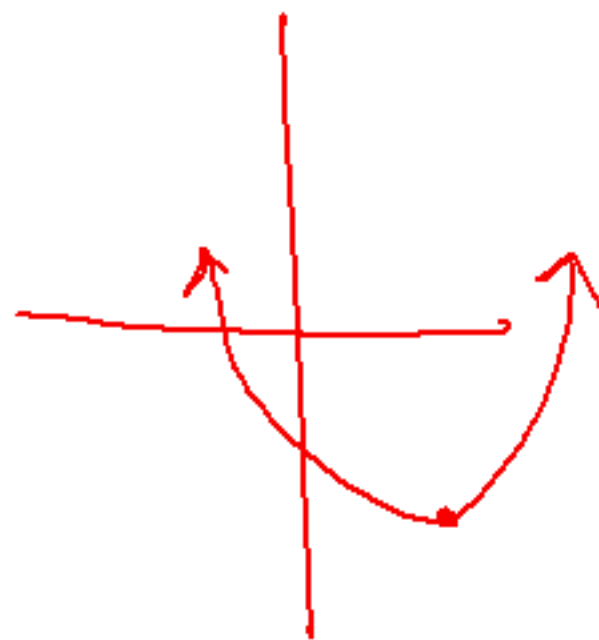


$$32) y = (x-2)(x-6)$$

$$x = \frac{2+6}{2} = 4$$

$$\begin{aligned} y &= (4-2)(4-6) \\ &= 2 \cdot -2 \\ &= -4 \end{aligned}$$

$(4, -4)$



$$33) y = 4(x+1)(x-1)$$

$$x = \frac{-1+1}{2} = 0$$

$$\begin{aligned} y &= 4(1)(-1) \\ &= -4 \end{aligned}$$

$(0, -4)$



$$34) y = -(x+3)(x+5)$$

$$x = \frac{-3 + -5}{2} = -4$$

$$y = -(-4+3)(-4+5)$$

$$y = -(-1)(1)$$

$$= 1$$

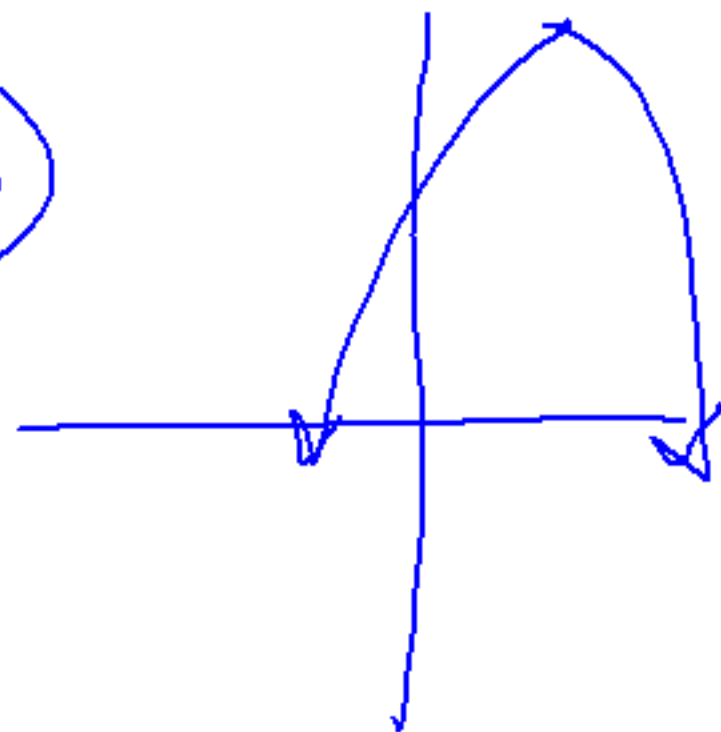
$$(-4, 1)$$



$$\textcircled{1} y = -2(x+3)(x-5)$$

$$x = \frac{-3+5}{2} = 1 \quad (1, 32)$$

$$y = -2(4)(-4) = 32$$



$$\textcircled{2} y = 3(x-1)(x-2)$$

$$x = \frac{1+2}{2} = \frac{3}{2} = 1.5$$

$$y = 3(1.5-1)(1.5-2)$$

$$y = -0.75$$

$$(1.5, -0.75)$$

